

The use of digital communication in the military establishment: Descriptive and analytical reading in light of the digital communication

استخدام الإتصال الرقمي في المؤسسة العسكرية:

قراءة وصفية تحليلية في ظل البيئة الرقمية

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• Abstract:

The use of digital communication has become an integral part of military establishments' activities, which are based on digital technology and have radically changed communication methods, coordination, and the effective implementation of military missions. It has contributed to enhancing their efficiency and ensuring the security of their information. Digital communication has permeated all areas of work in the Algerian military establishment, emphasizing the necessity of possessing various equipment for this new form of communication, mastering techniques, and understanding the best use of different media applications. This allows the military to play an effective role in defending the homeland and maintaining its security and stability. This study aims to highlight the reality of the use of digital communication in the Algerian military.

Keywords:

Digital communication, Digital environment, Military establishment.

• الملخص:

أضحى استخدام الاتصال الرقمي يشكل جزءاً لا يتجزأ من نشاطات المؤسسات العسكرية، التي أصبحت تعتمد بشكل متزايد على التكنولوجيا الرقمية التي أحدثت تغييراً جذرياً في طرق التواصل والتنسيق وتنفيذ المهام العسكرية بفعالية، بالإضافة إلى مساهمتها في تعزيز كفاءتها وضمان أمن معلوماتها. وفي ظل التطور الذي شهدته البيئة الرقمية، اقتحم الاتصال الرقمي بمختلف وسائله وشبكاته، جميع مجالات العمل في المؤسسة العسكرية الجزائرية، وأدركت هذه الأخيرة ضرورة امتلاكها لمختلف تجهيزات ووسائل هذا الرافد الإتصالي الجديد، بتوفير كل الإمكانيات للتحكم الأمثل في تقنياته والمعرفة الجيدة لكيفية استخدام مختلف تطبيقاته الإعلامية وتوظيفها بالشكل الذي يسمح بإبراز الدور الفعال الذي تقوم به هذه المؤسسة العتيقة في الدفاع عن الوطن والحفاظ على أمنه واستقراره. وعليه جاءت هذه الدراسة لتسليط الضوء على واقع استخدام الاتصال الرقمي في المؤسسة العسكرية الجزائرية.

الكلمات المفتاحية: الإتصال الرقمي، البيئة الرقمية، المؤسسة العسكرية.

• Introduction :

Communication has posed a significant challenge, and its use is an absolute necessity given the specificities of the modern establishment, which has shifted its organizational structure, from a hierarchical organizational structure to a network-based one that relies on modern communication network means. Its endurance, in a changing communication environment, depends on the inevitability of reconsidering the method of the communication process, in accordance with the most important requirements of the organization and its objectives.

Considering that traditional communication matches neither the organization's aspirations nor the digital revolution of the twenty-first century and the unprecedented information explosion it has caused.

Therefore, organizations in general, and the Algerian military establishment in particular, have adopted digital communication, which is characterized by interactivity, flexibility, immediacy and the rapid transmission and exchange of vast amounts of information, as an alternative to conducting all their communication and media activities, as well as effectively carrying out military tasks. Additionally, it contributes to enhancing its efficiency and ensuring the information security.

In this regard, it uses new communication tools, such as intranet, to facilitate the work for its users, ensure coordination and communication among them, support the effectiveness of their operational activities, and keep them informed about all updates related to their unit and the outside world.

Moreover, the military establishment utilizes the global internet and the new communication tools it has produced, like social media networks.

It leverages its official Facebook page, the official website of the Ministry of National Defence, and several other electronic media pages and applications; such as (MDNews) application to follow up on and post all its updates, broadcasting various relevant communication and operational activities and events, so that public opinion can view them.

Based on the above, the problem of this study is determined by attempting to understand the reality of the use of digital communication in the Algerian military establishment, through answering the following main question: **To what extent does the Algerian military establishment utilize digital communication, and what are the key requirements and challenges in the digital environment?**

We will try to answer this problematic question by addressing the following in a theoretical study:

- Introduction

- 1- The nature, importance, characteristics and benefits of digital communication.
- 2- The requirements for using digital communication in the Algerian military establishment.
- 3- Evolution of digital communication in the military field.
- 4- Applications and uses of digital communication in the military establishment.
- 5- The challenges of digital communication in the new digital environment.
- 6- The future of digital communication in the military establishment.

- Conclusion.

1- Basics of Digital Communication:

The revolution in information and communication technology has brought about significant changes in the methods of communication and interaction with others, either at the individual or institutional levels. The internet era, followed by the digital economy and the knowledge-based economy, has provided inventive and diverse methods for exchanging information, data, and documents between people. Effective and rapid communication technologies have emerged, such as the internet, intranet, extranet, mobile phones, voice mail, email, video conferences, interactive and satellite television networks, along with new communication tools such as social media networks, websites, and electronic applications. All these developments in communication have enabled individuals and institutions to exchange huge amounts of data and information in real-time, while saving time, effort, and money for both of them¹.

1.1- Definition of Digital Communication:

There are many definitions of digital communication, as it is considered one of the new branches of communication. Some define it as a type of communication that uses computers to exchange messages between individuals, either individually or collectively.

« Kristi Aho » defined it as the essential skill for most tasks that an individual must acquire in terms of concepts, production, transmission, and reception of communication tools in their work and life. Digital communication is the ability to create effective communication through various digital means. This definition is closely related to computer-assisted communication or computer-based communication. All of those definitions confirm that computers are crucial in the communication process.²

It is also defined as communication that relies on the internet by converting information, such as texts, images, and audio, into binary codes, consisting of sequences of 0S and 1S. It depends on electronic communication technology on one hand and web services on the other. The definitions of digital communication remain shaped by the contributions of modern communication technology in defining digital-based media, such as websites, videos, audio, text, and other multimedia, both dynamic and static.³

Researchers in interactive communication define digital communication as the “ability that allows one or more individuals to interactively communicate, such as a sender and receiver, with one or more individuals or with a machine in real-time or later, in the same way as email”.⁴

It also refers to “all communication methods carried out online, including websites, email, and social media.”

¹- Bashir Al-Allaq, *Communication in Public Organizations: Between Theory and Practice*, Dar Al-Yazouri Scientific Publishing and Distribution, Amman, 2009, pp. 94-95.

²- Mohamed Abdel Hamid, *Communication and Media on the Internet*, 1st ed., Cairo: Alam Al-Kutub, 2007, pp. 24-25.

³- Ridwan Mufleh Al-Ali et al., *Introduction to Electronic and Satellite Media*, 1st ed., Dar Al-Hamed Publishing and Distribution, Amman - Jordan, 2016, p. 83.

⁴- Xavier François, Julien Rosa Vallon, *E - communication*, Dunod, Paris, 2001, p 01.

In the context of the military establishment, digital communication is defined as “the process of using modern communication technologies to transfer information, orders, and data between units and individuals. This type of communication relies on digital technology to provide fast, reliable, and secure communication. These technologies encompass satellite communications, computer networks, mobile devices, and encrypted wireless systems. On an operational military level, digital communication intends to improve communication efficiency, ensure information security, and ease command and control. However, on an administrative communication level, it aims to amplify the military institution’s image by utilizing its modern digital communication tools, such as the official Ministry of Defense website, the official Facebook page, and various other electronic media applications “MDNews”, for posting and displaying its operational and communication activities and some updates for the public opinion.

1.2- Importance of digital communication in the military establishment:

Currently, digital communication is crucial for the institution’s success:

A- At the administrative communication level:

- To ensure and attain high levels of efficiency and interactivity in the communication process. As well as to provide digital communication’s technologies and enable meetings remotely (Video conferencing).
- To improve performance’s effectiveness and decision-making by providing information and data, and making them easily and effortlessly accessible through the internal network⁵.
- To keep the target audience, close to the establishment and break the ice between both parties through daily interaction, broadcasting, and offering its multiple activities for the public via its official website “www.mdn.dz”, or Facebook page.
- These new communication tools contribute to providing the public with immediate and complete information on the institution, disseminating more about its operational and communication activities to abroad audience quickly and directly, which allows public to be involved through interaction, feedback and suggestions. Additionally, they provide young people with several information concerning military recruitment campaigns and national service.
- Digital communication helps in better human resource management by tracking equipment, people, and locations in real time, in addition to contributing to the improvement of military training and educational programs through the provision of online educational and training platforms⁶.
- Improving the institution’s image and protecting it from various crises, while creating public awareness about it and what it offers by influencing the target audience through their presence on various available digital platforms: the website, the official page, the mobile application, blogs, and social media networks.

⁵- Bashir Abbas Al-Allaq, *Electronic Marketing Communications: An Analytical and Practical Approach*, Al-Warraq Publishing and Distribution, Amman, 2006, p. 20.

⁶- Hanan Shaaban, "Managing the Institution through Social Media Networks – A Technological Necessity in the Era of Digitalization," *The International Journal of Social Communication*, vol. 08, no. 04, 2021, p. 246.

- Protecting and monitoring the institution's reputation, as it allows the management of its presence across these digital platforms and focuses attention on the institutional identity it wants to solidify in the minds of its audience.

B- At the military operational level:

- Digital communication allows secure information exchange between different units, thanks to encryption and advanced protection techniques. This reduces the risks of eavesdropping and espionage and ensures the protection of sensitive information from various forms of breaches by unwanted parties.
- Digital communication eases coordination between different military units and divisions, which enhances operational effectiveness and reduces the likelihood of errors.
- In military environments, digital communication is an essential tool for crisis management and strategic planning through a variety of new communication methods and technologies, such as smartphones, laptops, and network systems. It allows military leadership to communicate instantly with deployed units, coordinate operations with high precision, and disseminate information quickly to the public, ensuring a swift response. This approach reflects on what has been observed in the use of digital technologies in education and crisis management on a broader scale. Social networks and digital technologies are also used to gather real-time information, raise awareness of ongoing situations, make better decisions, and effectively coordinate efforts with local communities⁷.
- Digital technologies assist in data management, helping to collect, analyze, and store large amounts of information in an organized way, which contributes to boosting strategic planning and military operations⁸.

1.3- Characteristics and Benefits of Digital Communication in the Military establishment:

1.3.1- Characteristics:

In regard to the advancement of digital innovations, digital communication systems have overcome many of the differences between its forms and established a set of unified characteristics that are present across all forms and levels of digital communication, as follows:

A- Interactivity: Communication has become bidirectional, with parties in the communication process exchanging roles. Each party has the ability and freedom to influence the communication process at the time and place that suit them. This leads :

- The receiver becomes an active participant in the communication process and influences the construction of its elements through their diverse choices.
- The receiver does not only involve in choosing the content but goes beyond that by influencing it through feedback.
- Multiple participants are involved in the communication process, synchronously, as in video conferences.⁹

It should be noted that the concept of interactivity remains somewhat ambiguous currently, because it is related to several theories and concepts, including modern communication theories that reconsidered Lasswell's 1948 model: Who says what, in which channel, to whom, with what effect?

⁷- Haddow, G. D, Bullock, J, Introduction to Emergency Management. Elsevier, 2020, P 24.

⁸- Farwell, J. P, The Role of information Operations in Military Strategie. RAND Corporation, 2012, P 49 .

⁹- Mustafa Youssef Kafi, Interactive Media, 1st ed., Dar Al-Hamed Publishing and Distribution, Amman, 2016, p. 221.

Which assumed that the message flows from a sender to a passive receiver, i.e., a one-way communication flow¹⁰.

B- Variety: This is represented in the following:

- Variety concerning the sender: The sender can be one person interacting with another person or several people, such as Skype and Skype Vert.
- Variety concerning institutions: It can involve one institution or a group of institutions that interact with each other, or with other institutions¹¹.
- Variety concerning networks: It can involve one network or a group of networks interacting with each other, such as the interaction between Google or Yahoo search engines, and social media platforms like Facebook, Twitter, and YouTube.
- Providing personal communication via verbal, written communication, or email, through video conferences, discussion groups, or communication with websites.

C- Integration: Digital communication, through internet networks, enables various communication systems and forms, as well as different digital tools, which provides the user with the ability to store, print, send, record on compact disks (CDS), or re-send information to others via email.¹²

D- Overcoming time and space: Digital communication does not require communication parties to be in one place or at the same time (synchronization), except in chat sessions or video conferences. The emergence of many digital devices like laptops and phones has facilitated communication, no matter how far apart the communication parties are, due to the capability of digital devices and software to receive, send, store, load on devices, and retrieve information at the appropriate time.

E- Overcoming cultural boundaries: The internet, known as the “network of networks,” connects hundreds of thousands of global and regional networks, thus transcending geographical boundaries and making communication global (globalization).

F- Immersion in the communication process: For long periods of individual learning, the feature of immersion in using available programs has emerged. The spread of tools and hypertext has also helped in browsing and further immersion in information and ideas, largely because of the low cost of digital communication¹³.

G- Flexibility: The flexibility feature in communication is evident through an individual's ability to easily have access to numerous sources of information, allowing them to select good and reliable information from trusted sources.

1.3.2- Benefits :

Institutions have turned to technical solutions by using digital communication, In order to create a positive experience for employees. Its major benefits and advantages at the administrative and military operational levels include:

¹⁰- Noura Igaloun, "Digital Communication and Its Role in Tourism Development in Algeria: A Descriptive and Analytical Study of Tourism Institutions' Websites," PhD Thesis in Media and Communication Sciences, National School of Journalism and Information Sciences, 2020-2021, p 73.

¹¹- Chaffey, Dave, & Ellis-Chadwick, Fiona, Digital Marketing, 7th ed., Pearson Edition, France, 2019, p. 31.

¹²- Mustafa Youssef Kafi, *ibid*, p. 222.

¹³- *Ibid.*, pp. 223-224.

- **Accuracy and coordination:** Digital communication helps improve the accuracy of shared information and provides speed in data transmission, enabling military leaders to make more effective decisions based on up-to-date and accurate information. It also contributes to better coordination among different military units, whether ground, air, or naval forces. As leaders can instantly exchange orders and information, which enhances collaboration and execution of tasks among different forces.
- **Speed and efficiency:** Digital communication is a fast and effective means of transmitting information and orders between different units, enhancing the speed of response to threats and emergency situations.
- **Security and encryption:** Digital communication allows the use of encryption techniques to protect sensitive information from eavesdropping and breaches.
- **Improving job performance:** Digital communication greatly contributes to improving job performance within military establishments, by facilitating faster and more accurate information exchange between units and individuals, which improves the ability to make quick decisions based on accurate information.
- **Enhancing employee participation:** Communication is a core aspect of workforce commitment. The digital tools integrated into the workplace offer easy communication methods. Additionally, they keep employees continuously posted on new updates and them to share their thoughts, experiences, and ideas more widely.
- **Ability to work better and faster:** Old tools, weak communication, and difficulty in finding information can frustrate employees and lower productivity. Digital communication technologies make it easier for employees to collaborate faster, access precise information more quickly, and perform their tasks more accurately.
- **Interconnection and integration between systems:** Digital networks connect various military systems (command and control systems, intelligence systems, reconnaissance systems), which enhances coordination and cooperation among different services, structures, and units.— Digital coding can offer higher confidentiality than analog encoding, and it also facilitates error correction, better signal retrieval, and ease of information exchange using packet switching and storage methods across multiple networks.
- **Training and simulation:** Digital communication greatly supports training and simulation programs within the military establishment. As it is possible to create virtual training environments that, improve the efficiency of military personnel and prepare them to deal with various combat scenarios. This reduces the need for costly and dangerous field training. The digital environment also provides advanced simulation tools for military training, where virtual and augmented reality can be used to train soldiers in complex tasks in simulated combat conditions, reducing the cost and risks associated with traditional training¹⁴.

2- Requirements for using Digital Communication in Algerian Institutions:

Considering the immense importance of new digital communication technology in revitalizing the communication process within institutions, enhancing speed, flexibility, and interactivity, most

¹⁴- Rosen, Joseph, Virtual Training and Stimulation for the Military, 2008 p23.

countries around the world have worked on building and developing a strong technological base. Algeria, like other nations, has become aware of the importance of new digital communication technologies and their role in embodying digital communication within institutions.

Consequently, Algeria has adopted a strategy to promote the field of media and information technology, support the immediate transition from the traditional communication to the digital one. Therefore, it has set up an ambitious program that contains three important phases, as follows:

▪ **First phase 1985 to 2000:**

The first phase focused on quickly adopting new communication technologies in institutional administrations. In these terms, the following steps were taken:

A- Computer deployment: To ensure a proper functioning of Algerian institutions, the state purchased and distributed computers to some institutions due to their high cost. Initially, the spread of computers was limited, as only a few were available. However, this shortage was addressed when costs dropped and devices became smaller in size. During the 1980s, there was a significant expansion in the use of computers, encouraging many institutions to acquire them and utilize them. However, computers were first used in public institutions of a strategic nature, and gradually they were integrated into production management in large industrial complexes.

Later on, Algeria concentrated on training and retraining staff working in various institutions that had implemented computerization, to develop their skills and improve their service levels.

B- Internet network: Thanks to the efforts of the Research Center for Computer Science and Technology (Cerist), Algeria was able to establish private local networks that were linked to regional and international networks in March 1994, when Algeria was connected to the internet for the first time. According to recent figures, more than 600 national institutions, including the military one, have been connected to improve their working methods, particularly through the online application of various services, and the internet network that allows opening up the field of digital communication, making information available anytime and anywhere.

▪ **Second phase 2000 to 2005:**

The second phase focused on rapidly developing mechanisms that enable the use of information and communication technology equipment and networks (Internet, Intranet, Extranet) in the management of institutions. In this context, a significant number of public and private institutions made efforts to develop information systems, local networks (Intranet), and websites. The public institutions were the first to use these technologies, such as postal services, aviation, and the military establishment, which witnessed noticeable growth and expansion thanks to efficient and fast data channels, that's why Algeria directed its efforts toward strengthening international cooperation, with national authorities allocating significant budgets for cooperation projects in this sector, particularly in the areas of training and technological transfer. This enabled institutions to access a database of technological information and other relevant data in order to improve institutional performance, increase competitiveness, and allow them to take advantage of opportunities provided by the vast and dynamic market. Digital communication helps improve performance and services, which provides new sources of information.

▪ **Third phase: 2005 to the present:**

After Algeria's efforts to establish a solid computer network infrastructure, develop its industry, and generalize its use across all institutions (military, economic, educational, etc.), the country achieved a qualitative leap in providing the requirements for electronic communication within institutions during this phase, by creating and establishing modern communication networks (Internet, Intranet, Extranet) in most institutions.

The implementation of this process began by connecting institutions, particularly the military, with internal Intranet networks, enabling them to exchange vast amounts of information and electronic correspondence. This initiative improved communication within institutions and paved the way for the actual use of digital communication. Algeria continues its efforts to further strengthen the infrastructure of fast electronic and digital communications in all institutions, allowing them to offer high-quality, secure services.

3- Evolution of Digital Communication in the Military Field:

Digital communication in the military has undergone a significant transformation since the end of the 20th century and the beginning of the 21st century. The digital revolution has drastically influenced military strategies and combat methods. Military communication technologies have evolved notably as they have been shifted from the traditional use of wireless devices and radars to a substantial reliance on digital networks and advanced systems such as military internet (Milnet) and satellite communication systems. This transformation has enabled military institutions to communicate instantly and exchange information in real time, greatly enhancing rapid response capabilities in combat zones.

The digital revolution has imposed significant strategic changes on global armies, leading to the development of new systems for controlling and directing weapons and sensors through rapid electronic processing technologies. This has led to improve the efficiency of military operations and increase combat effectiveness. However, these transformations have also imposed new challenges, such as the need to secure information and systems against cyberattacks and the necessity for military updates driven by technological changes caused by the digital revolution. This has changed the nature of warfare and emphasized the importance of information in raising combat effectiveness while also creating new challenges that require collaboration between military and civilian sectors to address them.¹⁵

They can be summarized as follows:

A. Digital Technology Transformations in Military Communication: the most prominent feature of the evolution of digital communication in the military field is the transition from analog systems to digital ones, which has improved the efficiency and speed of information transmission. It has become possible to send vast amounts of digital information quickly over broad-band communication channels, leading to increased effectiveness in tactical and strategic operations.

Historically, the theory of digital communication was established in 1948 when scientists discovered the ability to express analog signals in discrete (digital) signals, which could be retrieved. However, digital components in communication devices were initially limited to conversion elements (A/D and D/A), while other communication elements remained analog. Most

¹⁵- Nargis Felissi, "The Digital Revolution in Military Affairs and Its Impact on the Military Strategy of Nations," Journal of Social and Human Sciences, vol. 21, no. 2, University of Batna, December 2020, pp. 389-408.

armies around the world have resorted to intensive and advanced use of digital technologies to enhance their communications, aiming to achieve battlefield control, process as much information as possible, transmit it quickly, reduce connection times in networks, lower the number of threat sources, distinguish between friendly and enemy signals, and provide advanced and high-quality communication services in those networks. The 1990s marked a significant entry point for adopting this mode of communication within an ever-expanding framework. The comprehensive information revolution that began in the early 2000s, especially through mobile phones and the internet, alongside satellite technologies, has seen unprecedented expansion, contributing to the development of new concepts and techniques¹⁶.

B. Digital Communication via Satellites: Relying on satellites for military communications is one of the major technological transformations that have boosted the efficiency and effectiveness of armed forces. As they provide enormous capabilities for rapid and secure communication between different military units regardless of their geographical locations.

Satellites contribute to improving security and military defense through positioning and navigation systems, such as the Global Positioning System (GPS), providing accurate location information that enhances military operation success and troop safety. Additionally, satellites ease immediate and encrypted communication between military units, ensuring secure data transmission even in harsh environmental conditions and remote areas. They are also utilized for reconnaissance missions to gather intelligence and monitor adversary activities, which is helpful for strategic planning and military deterrence.

C. Digital Transformations and Their Impact on Communication in the Digital Environment: Media and communication means Witness significant transformations thanks to the digital environment. There has been a shift from traditional media to digital media, allowing for faster information exchange than ever before, enabling real-time communication across the globe through the internet and modern communication technologies.

Thanks to digital technology, individuals can communicate by texting, sending images and videos, which enhances the interaction and communication. The internet and digital transformations have made vast amounts of information easily accessible for people, allowing them and organizations to search for and find data quickly and efficiently.

Moreover, digital transformations enable the customization of messages based on user data and preferences, enhancing the effectiveness of communication and marketing. The digital environment has also provided interactive platforms, such as social media, which have changed communication methods between individuals and organizations, allowing users to participate and engage with content instantly¹⁷.

As reliance on digital communication increases, issues of cybersecurity and privacy protection have become critically important for institutions seeking to safeguard their communication networks from various forms of threats, including hacking and breaches.

¹⁶- Ali Mohammed Rajab, "Digital Technology in Military Communication Systems," Dir Al-Watan Journal, Directorate of Moral Guidance, United Arab Emirates, March 2014, pp. 45-55.

¹⁷- Castells, Manuel, The Rise of the Network Society: The Information Age: Economy, Society, and Culture, 2010, p. 65.

4. Applications and use of Digital Communication in the Military Establishment :

4.1- Definition of the Military establishment:

The word “military,” derived from the root “عسكر” (askar), refers to gathering, camping, and settling down. According to the Arab dictionary, the word “عسكر” means the army, signifying abundance in everything. In the “Lisan Al-Arab” dictionary, military is defined as a forceful attraction¹⁸.

The military establishment is defined as “a hierarchical organization consisting of armed individuals, established by the state and tasked with two primary duties: defending against external aggressors and conducting warfare beyond its borders, and, exceptionally, maintaining internal order”¹⁹.

Regardless of these different definitions, the common understanding of the military or military institution is that it “is an organization composed of militarily trained individuals, characterized by a hierarchical structure with ranks and command units. Its purpose is to ensure security both within and outside national borders, protect citizens and their property in the event of external threats to the country’s peace and stability, and maintain internal order. The institution’s ultimate goal is to achieve peace by defending the nation’s vital interests”²⁰.

Operationally, the military institution is defined as “an organization that includes all segments of society from various regions of the country. It consists of individuals organized hierarchically, trained militarily, and equipped administratively. Its mission is to defend the borders against any external threats, while also undertaking other humanitarian, social, and economic roles.

It stands by the people during times of crisis and contributes to economic development by utilizing its various material and human resources for the benefit of society and the nation.”

4.2- Uses of Digital Communication in the Military Establishment:

4.2.1- In the Operational Military Field:

4.2.1.1- Command and Control Systems (C4ISR): Digital communication systems are used to enhance command and control operations, and provide a comprehensive picture of the operational situation. These systems include command, control, communications, computing, intelligence, surveillance, and reconnaissance. Modern armies rely on digital command and control systems to manage operations, allowing military leaders to monitor field situations and make decisions based on updated information. They also facilitate planning, management, coordination, and control of forces and operations through the use of specific devices, equipment, and communication networks, enabling the collection and analysis of data about various targets, and using it to prepare tactical responses promptly and effectively²¹.

4.2.1.2- Digital Communications for Command and Control Centers: Contemporary armies relied on advanced communication systems for command and control purposes, ensuring the flow of information to commanders at all levels, allowing them to know what is happening around them,

¹⁸- Ihsan Mohammed Al-Hassan, *Military Sociology*, 1st ed., Alexandria: Dar Al-Maarefah Al-Jami'eyyah, 1988, p112.

¹⁹- Abdel Wahab Al-Kayali, *Encyclopedia of Politics*, Arab Institute for Studies and Publishing, Beirut, 1991, p. 129.

²⁰- Morin, Jean Michel, *Précis de Sociologie*, France: Nathan, 1997, p. 76.

²¹- Albert, David S., & Hayes, Richard E., *Power to the Edge: Command*, Ed. Amazon, 2003, p. 63.

and enabling rapid intervention and fire support requests. Communication systems also provide control and the ability to handle large amounts of electronic systems with fast response times²².

4.2.1.3- Digital Communications for Command-and-Control Centers: Contemporary armies relied on advanced communication systems for command-and-control purposes, ensuring the flow of information to commanders at all levels, allowing them to know what is happening around them, and enabling rapid intervention and fire support requests. Communication systems also provide control and the ability to handle large amounts of electronic systems with fast response times²³.

4.2.1.4- Digital Battle Management: Using Geographic Information Systems (GIS) to provide accurate visualizations of the locations of forces and the enemy.

4.2.1.5- Reconnaissance and Surveillance: Drones and other digital reconnaissance technologies allow to collect and immediately analyze information concerning the enemy, which gives forces a strategic advantage, enabling them to transfer data and information to and from command centers. Digital communication contributes to an effective collection and analysis of data and information. Consequently, it helps in obtaining a comprehensive and accurate image of the operations.

4.2.1.6- Cybersecurity: With the increasing reliance on digital communications, cybersecurity has become a key component in protecting military information from cyberattacks.

4.2.1.7- Logistics Support: Digital communication systems improve the management of logistics by accurately tracking resources and supplies and ensuring their timely delivery to military units.

4.2.2. In the Administrative Military Field:

4.2.2.1- The Official Website of the establishment: The website on the internet serves as the institution's digital and electronic image and is the center of its online activity. It contains information about the institution's activities, services, and products, aiming to encourage both internal and external audiences to communicate with it electronically in order to build and maintain long-lasting relationships²⁴.

To highlight its efforts in various operational fields, the military institution publishes press releases on its official website (<https://www.mdn.dz>), providing the public with necessary updates and clarifications about the activities carried out by military personnel, always aimed at enhancing its public image and informing the public of the latest developments.

4.2.2.2- The Official Facebook Page of the Ministry of National Defence: To strengthen its presence in the digital space, the People's National Army has provided its users and external audiences with an official Facebook page "Algerian Ministry of National Defense Facebook". This page plays an important role in introducing the various units and structures of the People's National Army, showcasing daily activities such as recruitment campaigns, tree planting, crisis intervention, open days, media events, and guided tours aimed at strengthening the Army-Nation bond. It also highlights operational activities "combating remnants of terrorism, organized crime, drug

²² - Command and Control in Air Defense," Arab Army Forum, Military Sections, accessed January 22, 2021.

²³- Command and Control in Air Defense," Arab Army Forum, Military Sections, accessed January 22, 2022.

²⁴- Mahmoud Mohammed Khlouf, Public Relations in the Digital Age, Osama Publishing and Distribution, Amman, 1st ed., 2019, p. 57.

trafficking”, as well as military exercises designed to enhance the combat readiness of personnel in defense of the nation’s security and stability.

4.2.2.3- Using the Website for Recruitment: To ensure the success of its annual recruitment campaign, the Ministry of National Defense has established an online platform to receive applications from Algerian youth interested in joining the People’s National Army in various branches, services, and central directorates. They can access the recruitment website (<https://preinscription.mdn.dz>) and fill out an online form with personal information, such as name, phone number, email, and academic qualifications ²⁵.

4.2.2.4- Using Digital Communication to Enhance Electronic Publications for the Military Institution: Electronic publications facilitate communication with targeted audiences by providing specialized content and making it easier to access. This encourages greater audience interaction with the content.

One of the new digital communication platforms for the People’s National Army is the digital version of “Revue Eldjeich”, which complements the printed version of this leading magazine and official mouthpiece of the military institution. Publishing it online has attracted a large audience interested in following the military institution’s updates and learning about its tasks and efforts to maintain national security and stability. This has fostered trust and interactivity between the military institution and its audiences in the digital space, contributing to enhancing its image.

4.2.2.5- Using Media Applications to Publish Institutional Updates: Among the institutions, employing media applications is the military institution. The Ministry of National Defense launched the MDNews application, which is available on its official website (www.mdn.dz/mdnews.ap). This app keeps the public informed with real-time updates and news about the military institution, including press releases related to executed activities, recruitment announcements for the People’s National Army, and the latest information on national service. The app also includes other announcements and information published through this platform²⁶.

5. Challenges and Risks of Digital Communication in the Military Environment:

Despite the great pros of digital communication, military institutions face several challenges in its implementation, primarily the high costs of advanced technology, the constant need for updates and improvements, as well as certain risks, as outlined below:

5.1- Cyber-attacks: As reliance on digital technology increases, so does the intensity of cyber-attacks and electronic breaches, which are among the biggest challenges. Many hostile actors seek to breach military systems and disrupt communications, making it necessary to implement strong measures to protect military networks from threats, safeguard information from hacking and espionage, and require military institutions to make substantial investments, particularly in developing strong cyber defense systems designed to protect military networks through advanced security technologies, effective cyber defense strategies, and continuous training programs, for personnel on cybersecurity ²⁷.

²⁵ - Official Website of the Ministry of National Defense, <https://www.mdn.dz>.

²⁶ - <http://www.android-dz.com>, accessed January 6, 2020.

²⁷ - Peter. W. Singer & Allan Friedman, *Cybersecurity and Cyberwar*, Oxford University Press, 2013, p 75.

5.2- Cybercrimes: are resulted from the great development of modern information and communication technology that has introduced new forms and patterns of communication. This may pose a double-edged sword, especially for security and military institutions that are facing risks and crimes because of the misuse of information technology and the internet in criminal activities, such as electronic theft, espionage, data theft, and breaches of national security information, which can escalate to the creation of viruses that damage systems and destroy data. The alarming rise in cybercrimes related to the misuse of modern technology has threatened state security and the network systems of institutions²⁸.

5.3- Risks of Cybercrime and Cyber Threats to Military Institutions: Cybercrime or cyber espionage is one of the most serious threats facing modern military institutions. With significant technological advancements, military systems have become heavily depended on digital technology and network communications, making them vulnerable to cyber-attacks. Modern technological means, such as the internet, mobile phones, and computers—especially those equipped with cameras and Bluetooth—play a crucial role in violating the privacy of institutions and increasing the risk of information espionage on security and military institutions. This has made it difficult to monitor these institutions effectively due to the vast amounts of information available, leading to their misuse by hostile internal or external actors²⁹.

The main forms of cybercrimes affecting military institutions include:

A- Cyber Espionage and Targeting Sensitive Information: Cyber espionage is one of the most dangerous types of cybercrime facing military institutions. Hostile actors may use cyber-attacks to have access to sensitive information, such as military plans or intelligence data. For example, the U.S. Department of Defense (Pentagon) has been targeted by several attacks aimed at getting sensitive information, with some actors managing to steal classified data from Pentagon systems, leading the department to spend over 200 million dollars annually to protect its programs and information networks³⁰.

B- Information Forgery and Privacy Violations: These actions involve infiltrating systems to alter data, such as educational records, or accessing individuals' online accounts to spread false information about them.

C- Cyber Infiltration and Control of Military Systems: Cyber attackers can gain access to and take control of sensitive military systems, such as weapons systems or command and control systems, allowing the enemy to manipulate or disable these systems. This occurred in 2011 when an American drone was hacked by Iranian actors, who managed to control and land the aircraft within Iranian territory³¹.

D- Information Warfare and Misinformation Campaigns: Hostile actors use cyber-attacks to distort information or spread misinformation with the intent of causing confusion within military

²⁸-Saleh bin Ali bin Abdul Rahman Al-Rubiah, Digital Security and Protecting Users from Internet Risks, available at: <https://www.google.com>, accessed April 28, 2019.

²⁹- Dunn Cavelty, Myriam, Cyber-Security and Threat Politics: US Efforts to Secure the Information Age, Routledge, 2008, p 51.

³⁰- Hathaway, Oona A., & Crootof, Rebecca, "The Law of Cyber-Attack," California Law Review, 2017, p. 24.

³¹- Rid, Thomas, Cyber War Will Not Take Place, Oxford University Press, 2013, p. 32.

forces or influencing public opinion. For example, during the 2014 Ukraine crisis, Russian actors widely spread misinformation to undermine the morale of the Ukrainian army and instill fear among citizens.

E- Cyber Piracy: Cyber piracy is one of the most prevalent weapons in modern digital warfare. It encompasses a broad range of electronic conflict tools, and its mechanism relies on recruiting highly skilled individuals capable of infiltrating various communication and technological systems, such as computers, phones, and other devices. These skilled individuals, known as “hackers,” have the ability to breach a wide range of communication systems³².

F- Silent Messages: These are technically programmed messages for third-generation mobile phones that are sent without the phone’s owner realizing they have received them. These messages enable the sender to accurately determine the location of the person by calculating the signal strength emitted from the mobile device relative to the three nearest receiving centers.

G- Reputational and Trust Damage: Cyber-attacks targeting the release of sensitive or embarrassing information can damage the reputation of military institutions and erode trust, both within the military and among the public. Eroded trust can lower the morale of military personnel and undermine the operational readiness of forces, extending the impact to the institution’s wider audience. For example, in 2010, WikiLeaks exposed secret Pentagon documents, which negatively influenced the U.S. military’s reputation and led to a wave of internal and external criticism³³.

5.4- The Main Challenges of Cyberspace for Military Institutions: Cyberspace represents a new arena for security threats targeting military networks and communication systems. Hostile actors can exploit vulnerabilities in digital systems to launch cyber-attacks that disrupt sensitive operations. These cyber-attacks have multiplied due to the ambiguity surrounding the identification of the responsible parties, making it difficult to distinguish between espionage activities and preparations for an electronic attack. Countries such as Russia, China, and North Korea have demonstrated their ability to cause harm and destabilization through internet activities, including collecting security and intelligence information and espionage. This complicates the implementation of adequate preventive measures to counter cyberspace risks³⁴.

Moreover, the threats posed by social media platforms to military institutions cannot be overlooked. Social media has become a primary platform for spreading false news and rumors, which can negatively affect the morale of both military personnel and civilians. Some actors also use social media, particularly Facebook, as a tool for psychological warfare, aiming to create confusion and sow doubts among military personnel. Additionally, social media platforms can pose a significant threat to the security of sensitive national security information, especially through the leaking of classified information about operations via photos, videos, or the posting of military documents.

In response to these concerns, the military institution has raised the alarm by implementing awareness campaigns and deterrent measures. These initiatives urge military personnel to use social networks safely while adhering to confidentiality requirements, maintaining military secrets, and

³²- Walid Ghassan Saeed Jaloud, *The Role of Cyber Warfare in the Arab-Israeli Conflict*, Master's Thesis in Planning and Political Development, Graduate Studies Faculty, Nablus University, Palestine, 2013, p. 53.

³³- Klimburg, Alexander, *National Cyber Security Framework Manual*. NATO Cooperative Cyber Defence. Centre of Excellence, 2012, p 81.

³⁴- Benjamin Brake, *Strategic Risks of Ambiguity in cyberspace*, New York, Council in Foreign relations, May, 2015, P 152.

remaining vigilant against misleading information circulated in the virtual world, especially false news that could harm the military's reputation. Violators face disciplinary actions to safeguard military secrets and enforce confidentiality³⁵.

6. The Future of Digital Communication in the Military Establishment:

With constant advancements in artificial intelligence (AI) and the Internet of Things (IoT), digital communications in the military are expected to see significant developments, such as:

6.1- Artificial Intelligence (AI): AI plays a significant role in analyzing big data and improving digital communications by automating many processes and making smart decisions, in addition to providing strategic recommendations. This enhances military leaders' ability to make better decisions, helping in the detection, analysis, and countering of threats.

AI also plays an important role in improving digital communication within military institutions by:

- * Analyzing large amounts of data quickly and accurately, which aids decision-making within the military. For example, the U.S. Army uses AI solutions like Planter to analyze operational data, identify attack patterns, and predict them, helping to counter various terrorist threats and maintain security and stability.
- * Enhancing efficiency through the use of machine learning and big data analytics, which help in taking preventive actions against various threats, such as using AI-based surveillance systems to monitor borders and make the right decisions to counter potential threats.
- * Improving internal communication between different military units and formations by using advanced digital communication systems that ensure secure and efficient information exchange. These systems rely on advanced algorithms to ensure encryption and protect sensitive data from all forms of breaches, thereby enhancing military operation coordination and making them faster and more accurate in execution.
- * In Algeria's military, AI applications in digital communication are experiencing noticeable advancements toward modernizing and updating the armed forces, increasing their effectiveness in addressing current security challenges.

6.2- Augmented and Virtual Reality Technologies (AR/VR): AR and VR play a significant role in training military personnel more realistically and enhancing their ability to handle complex field situations. These technologies also contribute to operational planning by allowing forces to simulate real-life scenarios and improve their strategies. These technologies create simulation environments that can reproduce complex, real-world combat scenarios, reducing the risks of live training.

These technologies help improve military training through VR, allowing the creation of realistic combat environments where military personnel can train on various scenarios, such as urban combat or difficult terrains.

These scenarios involve tactics like combat techniques, emergency response, and resource management under pressure. Augmented reality (AR) enhances real environments with additional

³⁵- Wardle, C, & Derakhshan, H. Information disorder: Toward an interdisciplinary framework for research and policy making. Council of Europe report, 2017, p 35.

tactical information, such as target instructions and threats, allowing personnel to train in real locations with added virtual elements³⁶.

Using VR and AR can reduce the costs associated with traditional training that requires live ammunition and heavy combat equipment. It also minimizes the risks of practical training by enabling personnel to train in safe simulated environments before moving on to live training.

These technologies can be adapted for both individual and group training, allowing different military formations to train on cooperation and coordination in various tasks. These technologies also provide tools for analyzing military personnel's performance and offering immediate feedback, helping to identify strengths and weaknesses and continuously improve them³⁷.

6.3- Fifth-Generation Networks (5G): networks offer significant capabilities and advanced features that contribute to improving communication within the military institution by:

- Enhancing the speed and efficiency of military communications, increasing the forces' ability to respond quickly and coordinate closely. This enables military institutions to obtain intelligence information more quickly and effectively through the integration of new and advanced technologies³⁸.

- Improving remote control capabilities for drones, military robots, and defense systems.

- Enhancing communications in remote areas by providing stable and fast communications in these regions, which are often exposed to emergencies, thereby improving coordination between military units.

- Improving cybersecurity by providing higher levels of security through advanced encryption technologies, contributing to protecting military communications from cyber threats³⁹.

6.4- The Internet of Things (IOT) in the Military Field: IOT applies smart technology to defense and military systems, enhancing efficiency, analytical capabilities, and surveillance, and improving the integration of field devices and equipment. This allows for better monitoring of military assets and coordination of operations. IOT is part of the digital transformation of the military, where connected devices collect and analyze real-time data to improve operational decision-making.

Devices connected to the internet collect and quickly analyze information. For instance, drones equipped with sensors provide real-time information about enemy movements.

Military personnel can also be equipped with wearable devices to monitor their health, assess readiness, and improve combat efficiency. IOT-enabled systems allow for the rapid sharing of information between different units and commanders in the field, strengthening leadership, control, and quick responses to changing situations.

As reliance on IOT technology increases, cybersecurity becomes a top priority, requiring the development of technologies that ensure data and communication protection from various cyber-attacks and breaches. Despite the widespread adoption of IOT due to the growing number of connected devices, "security" remains a significant challenge. IOT security involves securing and protecting connected devices, data, and networks from various security threats, especially cyber-

³⁶- Khayr Shawahin, Virtual Reality and Augmented Reality, Modern World of Books for Publishing, Amman, Jordan, 2019, pp. 15-70.

³⁷- Tobias Hollerer & Dieter Schmalstieg, Augmented Reality: Principles and Practice, Amazon, 2016, pp. 10-55.

³⁸- Delisle, Jason, "5G Technology: Impact on the Future of Military Operations," Journal of Defense Management, 2020, p. 24.

³⁹- Williams, John, "The Role of 5G in Military Applications," Defense and Security Analysis, 2021, p. 52.

attacks, which increasingly target IOT applications and services. Advanced technology is required, with networks having features such as identification, confidentiality, integrity, and authentication to establish secure connections between devices and prevent data theft. Handling IOT applications with caution and continuously seeking solutions to maximize expected benefits and minimize potential losses is essential⁴⁰.

6.5- Cloud Computing and Its Role in Enhancing Digital Communication: Cloud applications are among the new internet phenomena and offer many benefits. They save institutions and individual's time and effort, reduce costs, and provide numerous services, such as those offered by Google for document processing "Docs.google.com", photo sharing on platforms like Flickr and Instagram, and social media networks like Facebook, Twitter, and YouTube. Institutions benefit from these services for storing information, providing information security services, and offering email accounts to employees and users. This enables institutions to create a safe and economical communication environment for their users while gaining their trust and building a stable and documented database, which can be used to transmit the institution's visual identity to all audiences via email and regular browsing of the official website⁴¹.

Cloud computing plays a crucial role in enhancing digital communication capabilities by:

- Enhancing digital communication capabilities through the provision of secure and flexible data storage and exchange.
- Improving operational efficiency by offering a flexible and scalable infrastructure that allows military institutions to improve operational efficiency by reducing the time required for application and service deployment.
- Enhancing the military institution's cybersecurity by providing advanced tools and mechanisms for immediate response to cyber-attacks.
- Enabling military personnel to securely access information from anywhere at any time, improving decision-making speed and accuracy, especially during the execution of military exercises.
- Facilitating the sharing of information among military formations and achieving more effective and efficient collaboration and coordination.

Cloud computing helps military institutions achieve economic efficiency by reducing infrastructure costs and maintenance measures, as computing resources are provided on demand⁴².

- Conclusion:

From the overview provided in this study, it can be concluded that digital communication offers numerous advantages at the operational level for military forces, such as instant and secure communication. It has become a critical element in military planning and operations, enabling military leaders to make swift and effective decisions based on real-time information from the field.

⁴⁰- Raghdha Al-Bahi, "Internet of Things: Applications and Challenges," Analytical Article Published by the Egyptian Center for Strategic Studies (ECSS), October 31, 2019, p. 57.

⁴¹- Mell, Peter M, & Grance, Timothy, The NIST Definition of Cloud Computing, National Institute of Standards and Technology, 2011.

⁴²- Armbrust, Michael, et al., "A View of Cloud Computing," Communications of the ACM, 2010, pp. 50-58.

Moreover, it enhances military capabilities, improves unit performance, and increases operational efficiency. Digital communication has become indispensable in modern military establishments within the digital environment. At the administrative military level, it has given the institution a boost by improving internal workflows and enabling better management of the overwhelming flow of information, utilizing it to serve the institution's interests.

This form of communication encompasses all modern tools: computers, wired and wireless information exchange devices, Intranet and Internet networks, and various other communication tools such as email, the official website of the Ministry of National Defense, and the official Facebook page. These platforms are used interactively to improve the institution's public image and gain public trust by providing information on its missions, activities, and services. They also open channels for public feedback on these missions and activities, fostering suggestions and contributions that enhance the institution's image and reputation, further highlighting its role in protecting the nation, maintaining security and stability, and assisting the public during crises, reinforcing the Army-Nation bond.

It is clear from the above that the use of digital communication technologies in the Algerian military has supported its communication activities both internally, among its units and structures, and externally, with its various audiences. This is particularly evident through the benefits of fast information exchange, interactivity, flexibility, and the economy of effort and time in task execution. However, the rapid development of modern communication technologies presents increasing challenges for institutions, particularly in training personnel to use these technologies and in keeping pace with unprecedented developments, posing a major challenge for the future. For this reason, I propose the following recommendations to effectively enhance the use of digital communication, while considering the accompanying security and technological challenges:

- At the administrative military level:

- * Enhance the military institution's image by supporting interaction with audiences to understand their views and perspectives, using various new communication tools, such as the official website, Facebook page, and the MDNews app.
- * Take public suggestions into account and involve them in discussions aimed at improving services by creating electronic spaces, such as a blog or hosting live broadcasts via the institution's official website.
- * Facilitate communication with the public to help reinforce the institution's positive image.
- * Pay close attention to audience studies, focusing on categories, trends, age, and education levels, and market high-quality communication content about the institution to enhance its position and maintain its reputation and image within society.

- At the operational military level:

- * Continue investing in digital technology and developing effective strategies to protect and secure it, ensuring maximum benefit in military operations.
- * Digital communication represents a vital transformation that can improve operational efficiency and effectiveness, but this transformation requires addressing the associated security and technological challenges through innovative strategies.
- * The military institution can fully capitalize on the potential of the digital environment to enhance its defense and strategic capabilities, but it must cautiously address the associated challenges to ensure safe and effective usage.

* The reliance on digital technology requires advanced systems and significant investments in digital infrastructure and continuous personnel training to prevent the disruption or hacking of military communications.

* Ensure continuous training for military personnel to adapt to modern technologies, particularly digital systems, and ensure their effective and correct usage.

* The rapid advancement of digital technologies imposes a continuous need for military institutions to adapt and update their systems and infrastructure to keep pace with these changes. The technical complexities of digital communication systems require advanced techniques and ongoing maintenance by qualified personnel who are specialized in managing and operating these systems.

* Developing and maintaining digital infrastructure is one of the key challenges to ensure continuous communication. This infrastructure provides many benefits, including improved communication quality over the Internet, allowing data to be transferred quickly and efficiently, faster responses for connected devices and services, and improved work efficiency for individuals and institutions.

• Bibliography:

1- Books:

- Bashir Al-Allaq, Communication in Public Organizations: Between Theory and Practice, Dar Al-Yazouri Scientific Publishing and Distribution, Amman, 2009.

- Mohamed Abdel Hamid, Communication and Media on the Internet, 1st ed., Cairo: Alam Al-Kutub, 2007.

- Ridwan Mufleh Al-Ali et al., Introduction to Electronic and Satellite Media, 1st ed., Dar Al-Hamed Publishing and Distribution, Amman - Jordan, 2016.

- Xavier François, Julien Rosa Vallon, e - communication, Dunod, Paris, 2001.

- Bashir Abbas Al-Allaq, Electronic Marketing Communications: An Analytical and Practical Approach, Al-Warraq Publishing and Distribution, Amman, 2006.

- Haddow, G. D, Bullock, J, Introduction to Emergency Management. Elsevier, 2020.

- Farwell, J. P, The Role of information Operations in Military Strategy. RAND Corporation, 2012.

- Mustafa Youssef Kafi, Interactive Media, 1st ed., Dar Al-Hamed Publishing and Distribution, Amman, 2016.

- Chaffey, Dave, & Ellis-Chadwick, Fiona, Digital Marketing, 7th ed, Pearson Edition, France, 2019.

- Rosen, Joseph, Virtual Training and Stimulation for the Military, 2008.

- Castells, Manuel, The Rise of the Network Society: The Information Age: Economy, Society, and Culture, 2010.

- Ihsan Mohammed Al-Hassan, Military Sociology, 1st ed., Alexandria: Dar Al-Maarefah Al-Jami'eyyah, 1988.

- Abdel Wahab Al-Kayali, Encyclopedia of Politics, Arab Institute for Studies and Publishing, Beirut, 1991.

- Morin, Jean Michel, Précis de Sociologie, France: Nathan, 1997.

- Albert, David S, & Hayes, Richard E., Power to the Edge: Command, Ed. Amazon, 2003.

- Mahmoud Mohammed Khlouf, Public Relations in the Digital Age, Osama Publishing and Distribution, Amman, 1st ed, 2019.
- Peter. W. Singer & Allan Friedman, Cybersecurity and Cyberwar, Oxford University Press.
- Dunn Cavelty, Myriam, Cyber-Security and Threat Politics: US Efforts to Secure the Information Age, Routledge, 2008.
- Rid, Thomas, Cyber War Will Not Take Place, Oxford University Press, 2013.
- Klimburg, Alexander, National Cyber Security Framework Manual. NATO Cooperative Cyber Defence. Centre of Excellence, 2012.
- Benjamin Brake, Strategic Risks of Ambiguity in cyberspace, New York, Council in Foreign relations, May, 2015.
- Khayr Shawahin, Virtual Reality and Augmented Reality, Modern World of Books for Publishing, Amman, Jordan, 2019.
- Tobias Hollerer & Dieter Schmalstieg, Augmented Reality: Principles and Practice, Amazon, 2016.
- Williams, John, "The Role of 5G in Military Applications," Defense and Security Analysis, 2021.
- Mell, Peter M., & Grance, Timothy, The NIST Definition of Cloud Computing, National Institute of Standards and Technology, 2011.
- Wardle, C, & Derakhshan, H. Information disorder: Toward an interdisciplinary framework for research and policy making. Council of Europe report, 2017.

2- Articles:

- Hanan Shaaban, "Managing the Institution through Social Media Networks – A Technological Necessity in the Era of Digitalization," The International Journal of Social Communication, vol. 08, no. 04, 2021.
- Raghdha Al-Bahi, "Internet of Things: Applications and Challenges," Analytical Article Published by the Egyptian Center for Strategic Studies (ECSS), October 31, 2019.
- Nargis Felissi, "The Digital Revolution in Military Affairs and Its Impact on the Military Strategy of Nations," Journal of Social and Human Sciences, vol. 21, no. 2, University of Batna, December 2020.
- Ali Mohammed Rajab, "Digital Technology in Military Communication Systems," Dir Al-Watan Journal, Directorate of Moral Guidance, United Arab Emirates, March 2014.
- Delisle, Jason, "5G Technology: Impact on the Future of Military Operations," Journal of Defense Management, 2020.
- Hathaway, Oona A, & Crootof, Rebecca, "The Law of Cyber-Attack," California Law Review, 2017.
- Command and Control in Air Defense," Arab Army Forum, Military Sections, accessed January 22, 2021.
- Command and Control in Air Defense," Arab Army Forum, Military Sections, accessed January 22, 2022.

3- University Studies:

- Noura Igaloun, "Digital Communication and Its Role in Tourism Development in Algeria: A Descriptive and Analytical Study of Tourism Institutions' Websites," PhD Thesis in Media and Communication Sciences, National School of Journalism and Information Sciences, 2020-2021.

- Walid Ghassan Saeed Jaloud, The Role of Cyber Warfare in the Arab-Israeli Conflict, Master's Thesis in Planning and Political Development, Graduate Studies Faculty, Nablus University, Palestine, 2013.

4- Websites:

- Official Website of the Ministry of National Defense, <https://www.mdn.dz>.
- <http://www.android-dz.com>, accessed January 6, 2020.
- Saleh bin Ali bin Abdul Rahman Al-Rubiah, Digital Security and Protecting Users from Internet Risks, available at: <https://www.google.com>, accessed April 28, 2019.